



Converting from one set of units to another is something that scientists do every day. We have made this easier by adopting metric units wherever possible, and re-defining our standard units of measure so that they are compatible with the new metric units wherever possible.

In the western world, certain older units have been replaced by the modern ones, which are now adopted the world over. (see Wikipedia under 'English Units' for more examples). In this exercise, you will convert from...

Conversion Table:

4 Gallons = 1 Bucket	142.065 cubic cm = 1 Noggin
9 Gallons = 1 Firkin	1.296 grams = 1 Scruple
126 Gallons = 1 Butt	201.168 meters = 1 Furlong
34.07 Liters = 1 Firkin	14 days = 1 Fortnight
0.0685 Slugs = 1 Kilogram	0.2 grams = 1 Carat

- 1) A typical aquarium holds 25 gallons of water. Convert this to A) Firkins; B) Liters, and C) Buckets.
- 2) John weighs 7.2 Slugs, and Mary weighs 53 kilograms. Who weighs the most kilograms?
- 3) The passenger volume of a car is about 5.4 cubic meters. How many Noggins can fit inside the car?
- 4) Sven weighs 105 kilograms and finished a diet of pickled herring, losing 3.8 kilograms. A) How many Scruples did he lose? B) How many Scruples did he start out with?
- 5) The density of water is 1.0 grams/cm^3 . How many Scruples per Noggin is this?
- 6) Evelyn finished the Diamond Man Marathon by walking 400 kilometers in 18 days. What was her average speed in Furlongs per Fortnight?
- 7) A swimming pool holds 50,000 gallons of water. How many Butts were in the pool?
- 8) If a Fathom is 72 inches, and there are 2.5 centimeters per inch, how many kilometers are there in 3.6 Leagues if 1 League = 2640 Fathoms?
- 9) The original Cullinan Diamond was discovered in 1904 and weighs 3,106.75 Carats. A) How many grams is this? B) The polished Cullinan Diamond I (Great Star of Africa) weighs 530.2 Carats and is worth \$386 million. What is the approximate worth of the original Cullinan Diamond? C) What is the going rate for diamonds in terms of dollars per Carat? D) Dollars per gram?

Answer Key:

Conversion Table:

4 Gallons = 1 Bucket	142.065 cubic centimeters = 1 Noggin
9 Gallons = 1 Firkin	1.296 grams = 1 Scruple
126 Gallons = 1 Butt	201.168 meters = 1 Furlong
34.07 Liters = 1 Firkin	14 days = 1 Fortnight
0.0685 Slugs = 1 Kilogram	200 milligrams = 1 Carat

- A typical aquarium holds 25 gallons of water. Convert this to

 - Firkins; $25 \text{ Gallons} \times (1 \text{ Firkin}/9 \text{ Gallons}) = \mathbf{2.8 \text{ Firkins}}$
 - Liters, and $2.8 \text{ Firkins} \times (34.07 \text{ Liters}/1 \text{ Firkin}) = \mathbf{95.4 \text{ Liters}}$
 - Buckets. $25 \text{ Gallons} \times (1 \text{ Bucket}/4 \text{ gallons}) = \mathbf{6.3 \text{ Buckets.}}$
- John weighs 7.2 Slugs, and Mary weighs 53 kilograms. Who weighs the most kilograms?
 $\text{John} = 7.2 \text{ Slugs} \times (1 \text{ kg}/0.0685 \text{ Slugs}) = \mathbf{105 \text{ kg}}$ so **John weighs the most kilograms.**
- The passenger volume of a car is about 5.4 cubic meters. How many Noggins can fit inside the car?
 $5.4 \text{ cubic meters} \times (1,000,000 \text{ cubic cm}/1 \text{ cubic meter}) \times (1 \text{ Noggin}/142.065 \text{ cubic cm}) = \mathbf{38,028 \text{ Noggins!}}$
- Sven weighs 105 kilograms and finished a diet of pickled herring, losing 3.8 kilograms.

 - How many Scruples did he lose? $3.8 \text{ kg} \times (1,000 \text{ gm}/1 \text{ kg}) \times (1 \text{ Scruple}/1.296 \text{ grams}) = \mathbf{2,932 \text{ Scruples.}}$
 - How many Scruples did he start out with? $105 \text{ kg} \times (1,000 \text{ gm}/1 \text{ kg}) \times (1 \text{ Scruple}/1.296 \text{ grams}) = \mathbf{81,018 \text{ Scruples}}$
- The density of water is 1.0 grams per cubic centimeter. How many Scruples per Noggin is this?
 $1 \text{ gram} \times (1 \text{ Scruple}/1.296 \text{ grams}) = 0.771 \text{ Scruples.}$
 $1 \text{ cubic centimeter} \times (1 \text{ Noggin}/142.065 \text{ cubic cm}) = 0.007 \text{ Noggins.}$
 Dividing the two you get $0.771 \text{ Scruples}/0.007 \text{ Noggins} = \mathbf{110 \text{ Scruples/Noggin.}}$
- Evelyn finished the Diamond Man Marathon by walking 400 kilometers in 18 days. What was her average speed in Furlongs per Fortnight?
 $400 \text{ kilometers} \times (1,000 \text{ meters}/1 \text{ km}) \times (1 \text{ Furlong}/201 \text{ meters}) = 1,990 \text{ Furlongs.}$
 $18 \text{ days} \times (1 \text{ Fortnight}/14 \text{ days}) = 1.28 \text{ Fortnights.}$
 Dividing the two you get $1,990 \text{ Furlongs}/1.28 \text{ Fortnights} = \mathbf{1,555 \text{ Furlongs per fortnight.}}$
- A swimming pool holds 50,000 gallons of water. How many Butts were in the pool?
 $50,000 \text{ gallons} \times (1 \text{ Butt}/126 \text{ gallons}) = \mathbf{397 \text{ Butts.}}$
- If a Fathom is 72 inches, and there are 2.5 centimeters per inch, how many kilometers are there in 3.6 Leagues if 1 League = 2640 Fathoms?
 $3.6 \text{ Leagues} \times (2640 \text{ Fathoms}/1 \text{ League}) \times (72 \text{ Inches}/1 \text{ Fathom}) = 684,288 \text{ inches.}$
 $684,288 \text{ inches} \times (2.5 \text{ cm}/1 \text{ inch}) \times (1 \text{ meter}/100 \text{ cm}) \times (1 \text{ kilometer}/1000 \text{ meters}) = \mathbf{17.1 \text{ kilometers.}}$
- The original Cullinan Diamond was discovered in 1904 and weighs 3,106.75 Carats.

 - How many grams is this?
 $3,106.75 \text{ carats} \times (0.2 \text{ grams}/1 \text{ carat}) = \mathbf{621.2 \text{ grams.}}$
 - The polished Cullinan Diamond I (Great Star of Africa) weighs 530.2 Carats and is worth \$386 million. What is the approximate worth of the original Cullinan Diamond?
 $386 \text{ million dollars} \times (3106.75 \text{ carats}/530.2 \text{ carats}) = \mathbf{\$2.26 \text{ billion.}}$
 - What is the going rate for diamonds in terms of dollars per Carat?
 $386 \text{ million dollars} / 530.2 \text{ carats} = \mathbf{\$728,027 \text{ per carat.}}$
 - Dollars per gram?
 $728,027 \text{ dollars} / \text{carat} \times (1 \text{ carat}/0.2 \text{ grams}) = \mathbf{\$3.6 \text{ million} / \text{gram.}}$